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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

Claim 1 (canceled)

Claim 2 (currently amended): The method of claim ~~1~~35, wherein generating a plurality of cutout particles comprises:

~~rendering the geometric objects to produce a depth map,~~ the depth map including a plurality of entries that each indicate a distance to a nearest geometric object from a camera position in a particular direction; and

generating cutout particles from at least some of the entries in the depth map, each cutout particle corresponding to an entry in the depth map in three-dimensional space.

Claim 3 (original): The method of claim 2, wherein the cutout particles are generated at a higher resolution than the particle image.

Claim 4 (previously presented): The method of claim 2, wherein the cutout particles are generated at a higher resolution than the particle image along silhouette edges of the depth map.

Claim 5 (currently amended): The method of claim ~~1~~35, wherein generating a plurality of cutout particles comprises sampling the geometric objects at a higher resolution than the particle image at least in areas where aliasing is likely to occur.

Claim 6 (currently amended): The method of claim ~~1~~35, wherein the rendering the particle systems with the cutout particles comprises:

for at least some of the particles of the particle systems and at least some of the cutout particles, performing a compositing operation to determine a coloring effect for the particles or an occluding effect for the cutout particles on one or more pixels of the particle image.

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Claim 7 (original): The method of claim 6, wherein the compositing operation is performed for the particles from the farthest particle from a camera position to the nearest particle.

Claim 8 (original): The method of claim 6, wherein the particles of the particle systems have coloring effects on at least one pixel of the particle image and the cutout particles have occluding effects on at least one pixel of the particle image, a coloring effect tending to accumulate color for the pixel and an occluding effect tending to block any accumulated color for the pixel.

Claim 9 (currently amended): The method of claim ~~1~~35, wherein the rendering <u>the particle systems with the cutout particles</u> comprises:

combining the particles from the particle systems and the cutout particles into a list;

sorting the list by each particle's distance from a camera position; and

for each particle in the list, from the farthest to the nearest, determining a coloring or an occluding effect of the particle on one or more pixels of the particle image.

Claim 10 (currently amended): The method of claim ~~1~~35, wherein the rendering <u>the particle systems with the cutout particles</u> comprises:

combining the coloring effects of the particles of the particle systems and the occluding effects of the cutout particles to determine the color for a plurality of pixels in the particle image.

Claim 11 (currently amended): The method of claim ~~1~~35, wherein the rendering <u>the particle systems with the cutout particles</u> comprises:

resolving the coloring effects of the particles of the particle systems and the occluding effects of the cutout particles based on the depth of the associated particles.

Claim 12 (currently amended): The method of claim ~~1~~35, wherein the compositing comprises alpha blending the particle image with a rendered image of the geometric objects.

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Claim 13 (currently amended): The method of claim ~~13~~5, wherein the rendering <u>the particle systems with the cutout particles</u> comprises:

for each particle, determining which pixels in the particle image the particle covers and an amount of the pixel covered, as seen from a camera position.

Claim 14 (currently amended): The method of claim 13, wherein the rendering <u>the particle systems with the cutout particles</u> comprises:

computing a depth of field adjustment for a particle.

Claim 15 (currently amended): The method of claim 13, wherein the rendering <u>the particle systems with the cutout particles</u> comprises:

computing a motion blur adjustment for a particle.

Claim 16 (canceled)

Claim 17 (currently amended): The method of claim ~~16~~19, wherein each list of coverage layers is generated by processing the particles in order from farthest from a camera position to nearest.

Claim 18 (original): The method of claim 17, wherein computing a list of coverage layers for a pixel comprises:

adding a new coverage layer for a particle from a particle system that follows a cutout particle in the processing.

Claim 19 (currently amended): ~~The method of claim 16,~~ <u>A computer-implemented method to produce a particle image to be combined with a second image for animation, the method comprising:</u>

<u>generating a plurality of cutout particles associated with a three-dimensional position of objects in the second image;</u>

<u>for each of a plurality of pixels in the particle image, computing a list of coverage layers for the pixel, where each coverage layer in the list of coverage layers includes an accumulated color</u>

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value due to one or more particles of a particle system and an amount occluded by one or more of
the cutout particles;

    determining the color of the pixels based on their associated coverage layer list; and

    displaying the composited image on a display;

    wherein generating the cutout particles comprises:

    computing a depth map for the second image; and

    generating a cutout particle for at least some entries in the depth map, each cutout particle
having a position and radius in three-dimensional space corresponding to the depth map entry.

Claim 20 (original): The method of claim 19, wherein at least portions of the depth map
have a higher resolution than the particle image.

Claim 21 (currently amended): The method of claim ~~16~~19, wherein the cutout particles are
generated at a higher resolution than the particle image.

Claim 22 (currently amended): The method of claim ~~16~~19, wherein generating a plurality of
cutout particles comprises sampling geometric objects in the second image at a higher resolution
than the particle image at least in areas where aliasing is likely to occur.

Claim 23 (currently amended): A computer program product comprising a computer-
readable medium containing computer program code for performing ~~any one of~~ the method ~~methods~~
~~of claims 1 through 22~~ claim 35.

Claim 24 (currently amended): A system for generating an image based on a scene
description that includes one or more geometric objects and one or more particle systems, the
system comprising:

    a geometry renderer that renders the geometric objects in the scene description to generate
~~an~~ a geometric image and a depth map of the geometric objects;

    a cutout particle generator that generates a plurality of cutout particles from the depth map,
each cutout particle corresponding to ~~a~~ one of the geometric ~~object~~ objects in the scene description;

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a particle renderer operatively coupled to the cutout particle generator that renders the particle systems of the scene description and the cutout particles to generate a particle image, wherein at least some cutout particles occlude particles of the particle systems; and

a compositor operatively coupled to the geometry renderer and particle renderer that combines the geometric image and the particle image to form a composited image.

Claim 25 (canceled)

Claim 26 (currently amended): The system of claim 2524, wherein the cutout particle generator generates the cutout particles at a higher resolution than the particle image at least in areas where aliasing is likely to occur.

Claim 27 (original): The system of claim 24, wherein the particle renderer processes the particles from the farthest particle from a camera position to the nearest particle.

Claim 28 (original): The system of claim 24, wherein the particle renderer is configured to:
combine the particles from the particle systems and the cutout particles into a list;
sort the list by each particle's distance from a camera position; and
for each particle in the list, from the farthest to the nearest, determine a coloring or an occluding effect of the particle on one or more pixels of the particle image.

Claim 29 (original): The system of claim 24, wherein the particle renderer is configured to combine the coloring effects of the particles of the particle systems and the occluding effects of the cutout particles to determine the color for a plurality of pixels in the particle image.

Claim 30 (original): The system of claim 24, wherein for each of a plurality of pixels in the particle image, the particle renderer computes a list of coverage layers for the pixel, where each coverage layer in the list of coverage layers indicates an accumulated color value due to one or more particles of a particle system and an amount occluded by one or more cutout particles.

Claim 31 (original): The system of claim 24, wherein the compositor alpha blends the particle image and the geometry image to form the composited image.

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Claim 32 (currently amended): The method of claim ~~1~~35, further comprising generating the ~~image of the~~ geometric ~~objects~~ image and ~~an accompanying~~ the depth map using a geometry renderer.

Claim 33 (currently amended): The system of Claim 24, ~~A computer-implemented method for generating an image for animation based on a scene description that includes one or more geometric objects and one or more particle systems, the method~~ further comprising:
~~using a geometry renderer to render the geometry scene into a color image with an accompanying depth image;~~
~~for each pixel entry in the depth image, generating a cutout particle, each cutout particle corresponding to a geometric polygon in the scene description;~~
~~providing the cutout particles along with the other particle systems to a particle renderer, whereby some cutout particles occlude one or more particles in the particle systems;~~
splatting the particles in the particle systems and the cutout particles in the particle renderer in back to front order to resolve occlusion and generate a color image, wherein the particles hidden by the cutout particles have no or partial contribution to colors of the image~~; and~~
~~compositing the particle rendered image with the image of the geometric objects to create a final image including both the geometric objects and particle systems.~~

Claim 34 (currently amended): The method of Claim 35. ~~A system for generating an image with respect to a camera location for animation based on a scene description that includes one or more geometric objects and one or more particle systems, the system~~ further comprising:
~~a geometry renderer that renders the geometric objects in the scene description to generate an image that represents the view from the camera location and its accompanying depth map image;~~
~~a cutout particle generator that generates a plurality of cutout particles,~~ each cutout particle corresponding to an entry in the depth map which in turn represents the closest ~~geometry~~ geometric object to ~~the~~ a camera location in the scene description[[;]]
~~a particle renderer operatively coupled to receive the particle systems and the cutout particles generated by the cutout particle generator to generate a image that represents an image of the particle systems not occluded by the cutout particles; and~~

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~~a compositor operatively coupled to the geometry renderer and cutout-particle renderer that combines the geometric image and the particle image to form a composited image~~.

Claim 35 (new): A computer-implemented method for generating an image for animation based on a scene description having a plurality of objects including geometric objects and particle systems, the method comprising:

rendering the geometric objects to generate a geometric image;

rendering the geometric objects to produce a depth map;

generating a plurality of cutout particles from the depth map, each cutout particle corresponding to one of the geometric objects;

rendering the particle systems with the cutout particles to generate a particle image wherein at least some of the cutout particles occlude particles of the particle systems, thereby to generate a particle image;

compositing the particle image with the geometric image to create a composited image; and

displaying the composited image on a display.

Claim 36 (new): The method of Claim 35, further comprising providing a geometry renderer and a particle renderer, wherein the geometric objects are rendered by the geometry render and the particle systems and cutout particles are rendered by the particle renderer.

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